IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Hiroshi Sakai et al.	**Examiner:**	Jonathan J. Johnson
Serial No:	10/063,915	**Art Unit:**	1725
Filed:	May 23, 2002	**Docket:**	15574
For:	SOLDER PASTE PRINTING METHOD AND APPARATUS FOR PRINTING SOLDER PASTE ON A BOARD ON WHICH WIRING PATTERNS ARE FORMED	**Dated:**	June 15, 2006
		Confirmation No.:	4405

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 C.F.R. § 1.132

Sir:

I, Motoji Suzuki, hereby declare that:

1. I am one of the inventors named on U.S. Patent Application no. 10/063,915 filed on May 23, 2002.

2. I am employed by NEC Corporation, Tokyo, Japan, the assignee of the present application as an expert engineer.

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8(a)

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: ~~Mail Stop AF~~ Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date below. RD

Dated: October 10, 2006 RD

Richard J. Danyko

present application as an expert engineer.

3. It is my understanding that claims 1, 2, 4, 6 and 7 stand rejected under 35 U.S.C. §103(a) as being unpatentable over applicant's admitted prior art (AAPA) in view of Yagi, U.S. Patent No. 6,036,084.

4. The applicants respectfully disagree with the examiner's negative characterization of patentability. Submitted herewith as Exhibit "A" is Figure 1, which represents the results of experiments, conducted by the inventors, to quantify the amount of moisture (in density) in an atmosphere during printing employing a tin-zinc (Sn-Zn) containing solder paste. A horizontal line in Fig. 1 shows moisture (10 g/m^3) contained in the atmosphere, and the vertical line shows continuously printable time (hr), that is, the time for maintaining the quality of printing for the solder paste containing a tin-zinc (Sn-Zn) system solder. As seen from Fig. 1, the value for continuously printable time changes rapidly when the moisture is about 10 g/m^3.

5. It should be observed that where moisture content is about 20 g/m^3 or greater, the continuously printable time is about 3 hours. However, continuously printable time increases rapidly, approaching 24 hours as the moisture content approaches 10 g/m^3, and continuously printable time reaches 24 hours when the moisture content is a little greater than 10 g/m^3.

6. Also, that continuously printable time is in excess of 24 hours when the moisture is less than 10 g/m^3. Thus, continuously printable time that is equal to or in excess of 24 hours has technical significance because it allows the use of the solder paste containing a tin-zinc (Sn-Zn) system in a mass production line.

7. The above showing demonstrates a clear difference in the continuously printable time for moisture contents within and without the recited claim limitation of "equal to

or less than $10/gm^3$". To be within this limitation represents a substantial improvement in the present field that is not recognized by the prior art teachings of Yagi.

8. The present invention enables suppression of "an increase in the viscosity of the solder paste which is caused by the reaction of Zn in the tin-zinc (Sn-Zn) system solder". See, e.g. the present specification at page 5, line 24; page 6, line 5; page 7, line 23; and page 8, line 7. My fellow inventors and I studied the reaction of Zn -- an active metal -- in the above-described reaction. We found that the reaction of the flux component with Zn, which undergoes change when moistened, continues for a short period of time, and accordingly, the viscosity of the solder paste containing a tin-zinc (Sn-Zn) system solder increases.

9. We also found that this lowers the coating property of the solder paste on the printing mask and causes the solder paste to attach to the squeegee. Thus, after a few hours after starting the printing process, the solder paste would fail to sufficiently fill the apertures of the printing mask which, in turn, may cause a failure in the printing. The increasing viscosity of the solder paste, again caused by the reaction of Zn, is particular to the tin-zinc (Sn-Zn) solder system containing Zn as an active metal.

10. Because moisture levels in the present claimed solder paste printing method is maintained at 10 g/m^3, the claimed method delays degradation of the solder paste for up to approximately 24 hours, rendering solder paste usable in mass production lines.

11. On the contrary, at page 6, lines 17-22 of the present specification, it is indicated that the wettability of the solder is degraded during the printing process of the solder paste, when the solder material, particularly the zinc (Zn), is oxidized by the reaction with an oxygen contained in the atmosphere. As a result, many solder balls are generated during the mounting process of the electronic components." As can be understood from this, the factor of

generation of the solder balls is considered in the present application in relation to the characteristic of tin-zinc (Sn-Zn) system solder.

12. These statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the patent Application or any patent issued thereon.

Dated: June 26, 2006

Motoji Suzuki

Motoji Suzuki
Inventor

Address of Declarant: c/o NEC Corporation
7-1, Shiba 5-chome
Minato-ku
Tokyo 108-8001, Japan

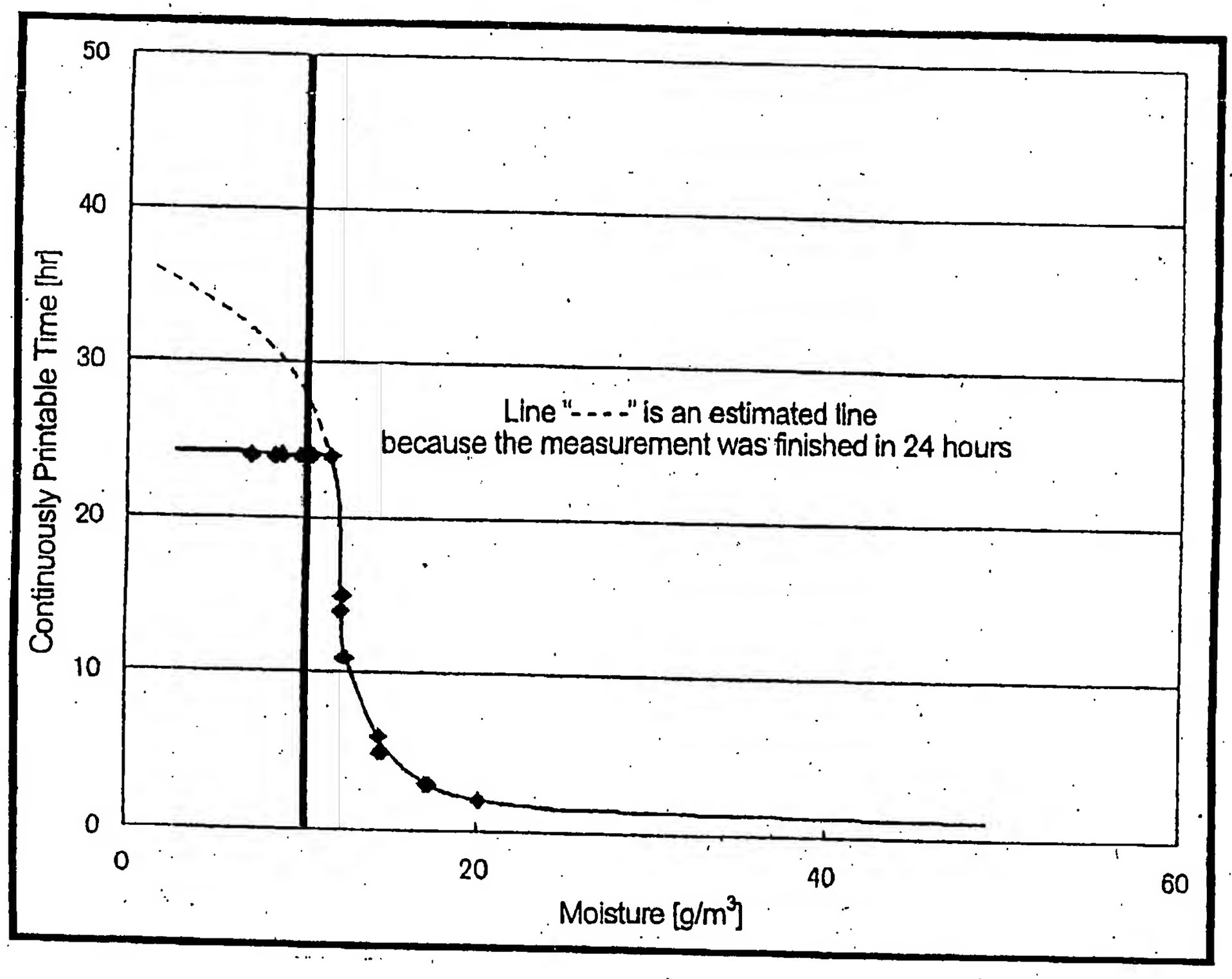

FIG. 1